

MILITARY SPECIFICATION

MICROCIRCUITS, DIGITAL, HIGH SPEED, CMOS,
AND GATES, OR GATES, MONOLITHIC SILICON, POSITIVE LOGIC

This specification is approved for use by all Departments and Agencies of the Department of Defense.

1. SCOPE

1.1 Scope. This specification covers the detail requirements for monolithic silicon, high speed, CMOS, logic microcircuits. Two product assurance classes and a choice of case outlines and lead finishes are provided and are reflected in the complete part number.

1.2 Part number. The part number shall be in accordance with MIL-M-38510, and as specified herein.

1.2.1 Device types. The device types shall be as follows:

<u>Device type</u>	<u>Circuit</u>
01	Quad 2 input OR gates
02	Quad 2 input exclusive OR gates
03	Quad 2 input AND gates
04	Triple 3 input AND gates

1.2.2 Device class. The device class shall be the product assurance level as defined in MIL-M-38510.

1.2.3 Case outlines. The case outlines shall be designated as follows:

<u>Outline letter</u>	<u>Case outline (see MIL-M-38510, appendix C)</u>
C	D-1 (14-lead, 1/4" x 3/4"), dual-in-line package
D	F-2 (14-lead, 1/4" x 3/8") flat package
2	C-2 (20-terminal, .350" x .350") square chip carrier package

1.3 Absolute maximum ratings.

Supply voltage (V_{CC})	- - - - -	-0.5 V dc +7.0 V dc
DC input voltage (V_{IN})	- - - - -	-0.5 V dc to V_{CC} +0.5 V dc
DC output voltage (V_{OUT})	- - - - -	-0.5 V dc to V_{CC} +0.5 V dc
Clamp diode current (I_{OC} , I_{IC})	- - - - -	±20 mA
DC output current per pin (I_{OUT})	- - - - -	±25 mA
DC V_{CC} or GND current per pin (I_{CC})	- - - - -	±50 mA
Storage temperature range (T_{STG})	- - - - -	-65°C to +150°C
Maximum power dissipation (PD)	- - - - -	300 mW
Lead temperature (soldering, 10 seconds)	- - - - -	+300°C
Thermal resistance, junction-to-case (θ_{JC}):		
D-1 and F-2	- - - - -	(See MIL-M-38510, appendix C)
C-2	- - - - -	60°C/W
Junction temperature (T_J)	- - - - -	+175°C

| Beneficial comments (recommendations, additions, deletions) and any pertinent data |
| which may be of use in improving this document should be addressed to: Rome Air |
| Development Center (RBE-2), Griffiss AFB, NY 13441, by using the self-addressed |
| Standardization Document Improvement Proposal (DD Form 1426) appearing at the end |
| of this document or by letter. |

1.4 Recommended operating conditions.

Device types 01, 02, 03, 04:

Input low (V_{IL}) maximum voltage - - - -	0.3 V at $V_{CC} = 2$ V
	0.9 V at $V_{CC} = 4.5$ V
	1.2 V at $V_{CC} = 6$ V
Input high (V_{IH}) minimum voltage - - - -	1.5 V at $V_{CC} = 2$ V
	3.15 V at $V_{CC} = 4.5$ V
	4.2 V at $V_{CC} = 6$ V
Supply voltage (V_{CC}) - - - - -	2 V dc to 6 V dc
Output voltage - - - - -	0 V dc to V_{CC}
Operating temperature (T_A) - - - - -	-55°C to +125°C

Input rise and fall times (t_r , t_f) maximum:

$V_{CC} = 2 \text{ V}$ 1000 ns
 $V_{CC} = 4.5 \text{ V}$ 500 ns
 $V_{CC} = 6 \text{ V}$ 400 ns

2. APPLICABLE DOCUMENTS

2.1 Government documents.

2.1.1 Specification and standard. The following specification and standard form a part of this specification to the extent specified herein. Unless otherwise specified, the issues of these documents shall be those listed in the issue of the Department of Defense Index of Specifications and Standards (DODISS) and supplement thereto, cited in the solicitation.

SPECIFICATION

MILITARY

MIL-M-38510 - Microcircuits, General Specification for.

STANDARD

MILITARY

MIL-STD-883 - Test Methods and Procedures for Microelectronics.

(Copies of the specification and standard required by manufacturers in connection with specific acquisition functions should be obtained from the contracting activity or as directed by the contracting activity.)

2.2 Order of precedence. In the event of a conflict between the text of this specification and the references cited herein (except for associated detail specifications, specification sheets or MS standards), the text of this specification shall take precedence. Nothing in this specification, however, shall supersede applicable laws and regulations unless a specific exemption has been obtained.

3. REQUIREMENTS

3.1 Detail specification. The individual item requirements shall be in accordance with MIL-M-38510, and as specified herein.

3.2 Design, construction, and physical dimensions. The design, construction, and physical dimensions shall be as specified in MIL-M-38510 and herein.

3.2.1 Logic diagrams and terminal connections. The logic diagrams and terminal connections shall be as specified on figure 1.

3.2.2 Truth tables and logic equations. The truth tables and logic equations shall be as specified on figure 2.

3.2.3 Schematic circuits. The schematic circuits shall be submitted to the preparing activity prior to inclusion of a manufacturer's device in this specification and shall be submitted to the qualifying activity as a prerequisite for qualification. All qualified manufacturers' schematics shall be maintained and available upon request.

3.2.4 Case outlines. The case outlines shall be as specified in 1.2.3.

3.3 Lead material and finish. The lead material and finish shall be in accordance with MIL-M-38510 and 6.4 herein.

3.4 Electrical performance characteristics. Unless otherwise specified, the electrical performance characteristics are as specified in table I, and apply over the full recommended case operating temperature range.

3.5 Electrical test requirements. The electrical test requirements for each device class shall be the subgroups specified in table II. The electrical tests for each subgroup are described in table III.

3.6 Marking. Marking shall be in accordance with MIL-M-38510. At the option of the manufacturer, marking of the country of origin may be omitted from the body of the microcircuit, but shall be retained on the initial container.

3.6.1. Total dose radiation hardness identifier. Total dose radiation hardness identifier shall be in accordance with MIL-M-38510 and 4.5.4 herein.

3.6.2 Serialization. All class S devices shall be serialized in accordance with MIL-M-38510.

3.6.3 Correctness of indexing and marking. All devices shall be subjected to the final electrical tests specified in table II after part number marking to verify that they are correctly indexed and identified by part number. Optionally, an approved electrical test may be devised especially for this requirement.

3.7 Microcircuit group assignment. The devices covered by this specification shall be in microcircuit group number 36 (see MIL-M-38510, appendix E).

4. QUALITY ASSURANCE PROVISIONS

4.1 Sampling and inspection. Sampling and inspection procedures shall be in accordance with MIL-M-38510 and methods 5005 and 5007, as applicable, of MIL-STD-883, except as modified herein.

4.2 Screening. Screening shall be in accordance with method 5004 of MIL-STD-883, and shall be conducted on all devices prior to qualification and quality conformance inspection. The following additional criteria shall apply:

- a. Delete the sequence specified as preburn-in electrical parameters through interim (postburn-in) electrical parameters and substitute lines 1 through 7 of table II herein.
- b. Burn-in (method 1015 of MIL-STD-883).
 - (1) Static tests (test condition A) using circuit shown on figure 3, or equivalent. Ambient temperature (T_A) shall be $+125^{\circ}\text{C}$ minimum. Test duration for each static test shall be 24 hours minimum for class S devices and in accordance with table I of method 1015 for class B devices.
 - (2) Dynamic test (test condition D) using circuit shown on figure 3, or equivalent. Ambient temperature shall be $+125^{\circ}\text{C}$ minimum. Test duration shall be in accordance with table I of method 1015.
- c. Interim and final electrical parameters shall be as specified in table II herein.

TABLE I. Electrical performance characteristics.

Test	Symbol	Conditions ¹ $-55^{\circ}\text{C} \leq T_C \leq +125^{\circ}\text{C}$ unless otherwise specified	Device type	V _{CC}	Limits Min	Max	Unit
High-level output voltage	V _{OH1} 2/	V _{IH} = 1.5 V V _{IL} = 0.3 V I _{OH} = -20 μA	A11	2.0 V	1.95	---	V
	V _{OH2} 2/	V _{IH} = 3.15 V V _{IL} = 0.9 V I _{OH} = -20 μA	A11	4.5 V	4.45	---	V
	V _{OH3}	V _{IH} = 4.2 V V _{IL} = 1.2 V I _{OH} = -20 μA	A11	6.0 V	5.95	---	V
	V _{OH4} 2/	V _{IH} = 3.15 V V _{IL} = 0.9 V I _{OH} = -4.0 mA	A11	4.5 V	3.7	---	V
	V _{OH5}	V _{IH} = 4.2 V V _{IL} = 1.2 V I _{OH} = -5.2 mA	A11	6.0 V	5.2	---	V
Low-level output voltage	V _{OL1} 2/	V _{IL} = 0.3 V V _{IH} = 1.5 V I _{OL} = 20 μA	A11	2.0 V	---	0.05	V
	V _{OL2} 2/	V _{IL} = 0.9 V V _{IH} = 3.15 V I _{OL} = 20 μA	A11	4.5 V	---	0.05	V
	V _{OL3}	V _{IL} = 1.2 V V _{IH} = 4.2 V I _{OL} = 20 μA	A11	6.0 V	---	0.05	V
	V _{OL4} 2/	V _{IL} = 0.9 V V _{IH} = 3.15 V I _{OL} = 4.0 mA	A11	4.5 V	---	0.4	V
	V _{OL5}	V _{IL} = 1.2 V V _{IH} = 4.2 V I _{OL} = 5.2 mA	A11	6.0 V	---	0.4	V
Positive input clamp voltage	V _{IC(POS)}	V _{CC} = GND I _{IN} = 1 mA T _C = +25°C	A11	---	---	1.5	V
Negative input clamp voltage	V _{IC(NEG)}	V _{CC} = Open I _{IN} = -1 mA T _C = +25°C	A11	---	---	-1.5	V

See footnotes at end of table.

TABLE I. Electrical performance characteristics - Continued.

Test	Symbol	Conditions ^{1/} $-55^{\circ}\text{C} < T_C < +125^{\circ}\text{C}$ unless otherwise specified	Device type	V _{CC}	Limits		Unit
					Min	Max	
Input current low	I _{IL}	V _{IN} = GND	All	6.0 V	---	-0.1	μA
Input current high	I _{IH}	V _{IN} = V _{CC}	All	6.0 V	---	0.1	μA
Short circuit output current	I _{OS1} ^{3/}	T _C = -55°C to +125°C V _O = GND	All	2.0 V	-2	-50	mA
	I _{OS2} ^{3/}	V _I = GND, V _{CC}		4.5 V	-15	-150	
	I _{OS3} ^{3/}			6.0 V	-25	-180	
	I _{OS4}			4.0 V	-10	-120	
Supply current quiescent	I _{CCL}	V _I = 0.0 V	All	6.0 V	---	10	μA
	I _{CCH}	V _I = 6.0 V	All	6.0 V	---	10	
Input capacitance	C _{IN}	T _C = 25°C	All	---	---	10	pF
Power dissipation capacitance	C _{PD}	T _C = 25°C ^{2/} ^{3/}	01 02 03 04	---	---	50 35 38 35	pF
Propagation delay times ^{4/} , ^{5/}	t _{PHL1} t _{PPLH1}	C _L = 50 pF +10%	01 03 04	4.5 V 4.5 V 4.5 V	3 4 5	23 28 29	ns ns ns
Propagation delay time, high-to-low level (other input low)	t _{PHL1}		02	4.5 V	3	28	ns
Propagation delay time, high-to-low level (other input high)	t _{PHL2}		02	4.5 V	3	28	ns
Propagation delay time, low-to-high level (other input low)	t _{PPLH1}		02	4.5 V	3	28	ns

See footnotes at end of table.

TABLE I. Electrical performance characteristics - Continued.

Test	Symbol	Conditions 1/ -55°C < T _C < +125°C unless otherwise specified	Device type 3/	V _{CC}	Limits	Unit	
				V _{CC}	Min	Max	Unit
Propagation delay time, low-to-high level (other input high)	t _{PLH2}	C _L = 50 pF +10%	02	4.5 V	3	28	ns
Transition delay times 4/, 5/	t _{THL} t _{T LH}		01	4.5 V	3	20	ns
			02	4.5 V	3	20	ns
			03	4.5 V	3	20	ns
			04	4.5 V	3	20	ns

- 1/ Complete terminal conditions shall be as specified in table III.
- 2/ Guaranteed but not tested.
- 3/ Power dissipation capacitance (C_{PD}) per gate.
- 4/ Tested at V_{CC} = 4.5 V at 125°C for sample testing and V_{CC} = 4.5 V at 25°C for screening.
Guaranteed at other V_{CC} voltages and temperatures, see table IA and exception in 4.4.1d.
- 5/ For propagation and transition delay times at V_{CC} = 2.0 V, increase limit by a factor of 5.
For propagation and transition delay times at V_{CC} = 6.0 V, decrease limit by a factor of .85.

TABLE IA. Calculated dynamic figures at -55/25 case temperature (°C).

V _{CC}	T _C = (°C)	
	125	-55/25
2.0 V	5 ↑	5 x 0.75 ↑
4.5 V	1 →	→ 0.75 ↓
6.0 V	0.85 ↓	0.85 x 0.75 ↓

Normalized numbers
(125°C equals 1)

NOTE: The 2.0 V and 6.0 V numbers are derived from their 4.5 V integer value.
Rounding off according 5/4.

TABLE II. Burn-in and electrical test requirements.

Line no.	Applicable tests and MIL-STD-883 test method	Class S device 1/				Class B device 1/			
		Ref. par.	Table III subgroups 2/	Table IV delta limits 3/	Test circuit figure	Ref. par.	Table III subgroups 2/	Table IV delta limits 3/	Test circuit figure
1	Interim electrical parameters (method 5004)		1				1		
2	Static burn-in I (method 1015)	4.2b 4.5.2	Req'd		3		Not req'd		
3	Same as Line 1		1	Δ					
4	Static burn-in II (method 1015)	4.2b 4.5.2	Req'd		3	4.2b 4.5.2	4/ req'd		3
5	Same as Line 1	4.2d	1*	Δ		4.2d	1*	Δ	
6	Dynamic burn-in (method 1015)	4.2b 4.5.2	Req'd		3		Not req'd		
7	Same Line 1	4.2d	1	Δ					
8	Final electrical parameters (method 5004)		1*,2,3,9				1*,2, 4/ 9		
9	Group A test requirements (method 5005)	4.4.1	1,2,3,4, 9,10,11			4.4.1	1,2,3,4, 9,10,11		
10	Group B end-point electrical parameters (method 5005)	4.4.2	+1,2,3,9, 10,11 5/	Δ	3		+1 5/		
11	Group C end-point electrical parameters (method 5005)					4.4.3	1,2	Δ	3
12	Group D end-point electrical parameters (method 5005)	4.4.4	1,2,3			4.4.4	1,2		

1/ Blank spaces indicate tests are not applicable.

2/ * indicates PDA applies to subgroup 1 (see 4.2.1).

3/ Δ indicates delta limit shall be required only on table III subgroup 1, where specified, and the delta values shall be computed with reference to the previous initial electrical parameters.

4/ The device manufacturer may at his option either complete subgroup 1 electrical parameter measurements, including delta measurements, within 96 hours after burn-in completion (removal of bias); or may complete subgroup 1 electrical measurements without delta measurements within 24 hours after burn-in completion (removal of bias).

5/ + indicates also applies to electrostatic discharge sensitivity tests.

- d. For class S devices, post dynamic burn-in, or class B devices, post static burn-in, electrical parameter measurements may, at the manufacturer's option, be performed separately or included in the final electrical parameter requirements.

4.2.1 Percent defective allowable (PDA).

- a. The PDA for class S devices shall be 5 percent for static burn-in and 5 percent for dynamic burn-in, based on the exact number of devices submitted to each separate burn-in.
- b. Static burn-in I and II failures shall be cumulative for determining the PDA.
- c. The PDA for class B devices shall be in accordance with MIL-M-38510 for static burn-in. Dynamic burn-in is not required.
- d. Those devices whose measured characteristics, after burn-in, exceed the specified delta (Δ) limits or electrical parameter limits specified in table III, subgroup 1, are defective and shall be removed from the lot. The verified failures divided by the total number of devices in the lot initially submitted to burn-in shall be used to determine the percent defective for the lot and the lot shall be accepted or rejected based on the specified PDA.

4.3 Qualification inspection. Qualification inspection shall be in accordance with MIL-M-38510. Inspections to be performed shall be those specified in method 5005 of MIL-STD-883 and herein for groups A, B, C, D, and E inspections (see 4.4.1 through 4.4.5).

4.4 Quality conformance inspection. Quality conformance inspection shall be in accordance with MIL-M-38510 and as specified herein. Inspections to be performed shall be those specified in method 5005 of MIL-STD-883 and herein for groups A, B, C, and D inspections (see 4.4.1 through 4.4.4).

4.4.1 Group A inspection. Group A inspection shall be in accordance with table I of method 5005 of MIL-STD-883 and as follows:

- a. Tests shall be performed in accordance with table II herein.
- b. Subgroups 5, 6, 7, and 8 of table I of method 5005 of MIL-STD-883 shall be omitted.
- c. Subgroup 4 (C_J measurement) shall be measured only for initial qualification and after process or design changes which may affect input capacitance. Capacitance shall be measured between the designated terminal and V_{SS} at a frequency of 1 MHz.
- d. Subgroups 9 and 11 shall be measured only for initial qualification and after process or design changes which may affect dynamic performance.

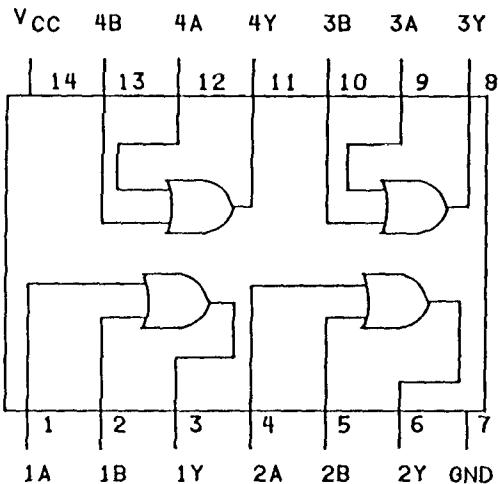
4.4.2 Group B inspection. Group B inspection shall be in accordance with table II of method 5005 of MIL-STD-883 and as follows:

- a. Class S steady-state life test circuits shall be submitted to the qualifying activity for approval. When the alternate steady-state life test is used, the circuit on figure 3, or equivalent, shall be used.
- b. Electrostatic discharge sensitivity (ESDS) testing shall be performed in accordance with MIL-STD-883, method 3015. The option to categorize devices as ESD sensitive without performing the test is not allowed. Device types categorized as ESD sensitive shall be further tested using method 3015 modified as follows:

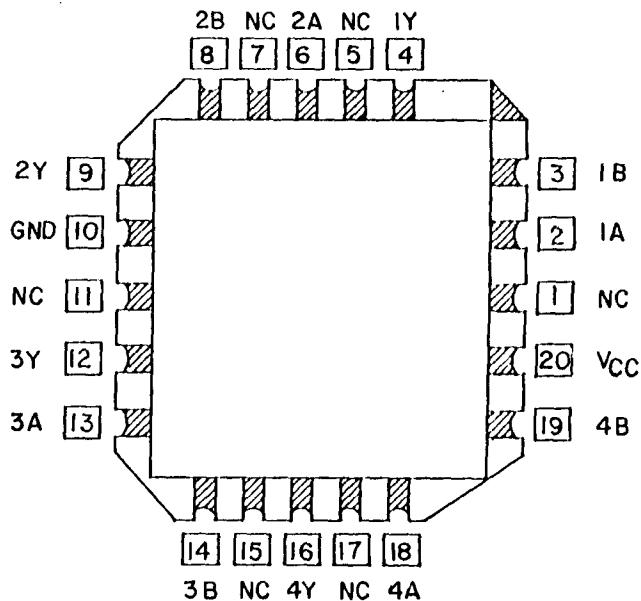
Text continues on page 23.

Device type 01

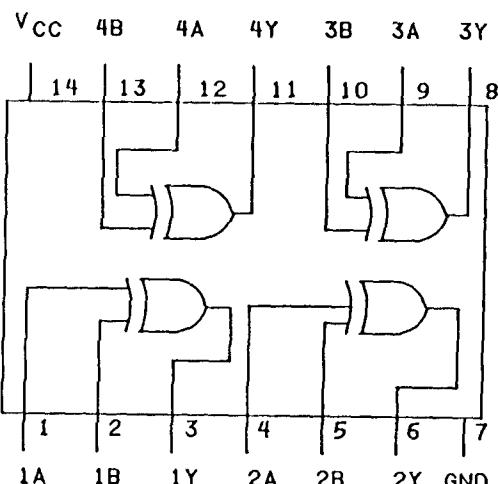
Cases C and D

Device type 01

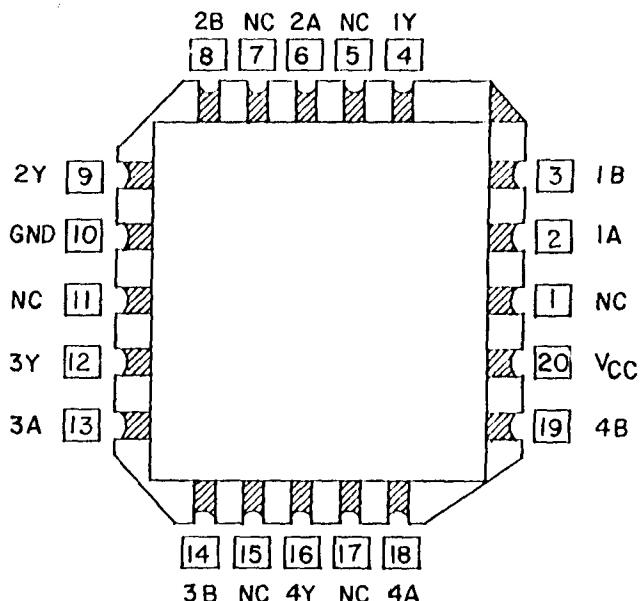
Case 2

Device type 02

Cases C and D

Device type 02

Case 2

FIGURE 1. Logic diagram and terminal connections (top views).

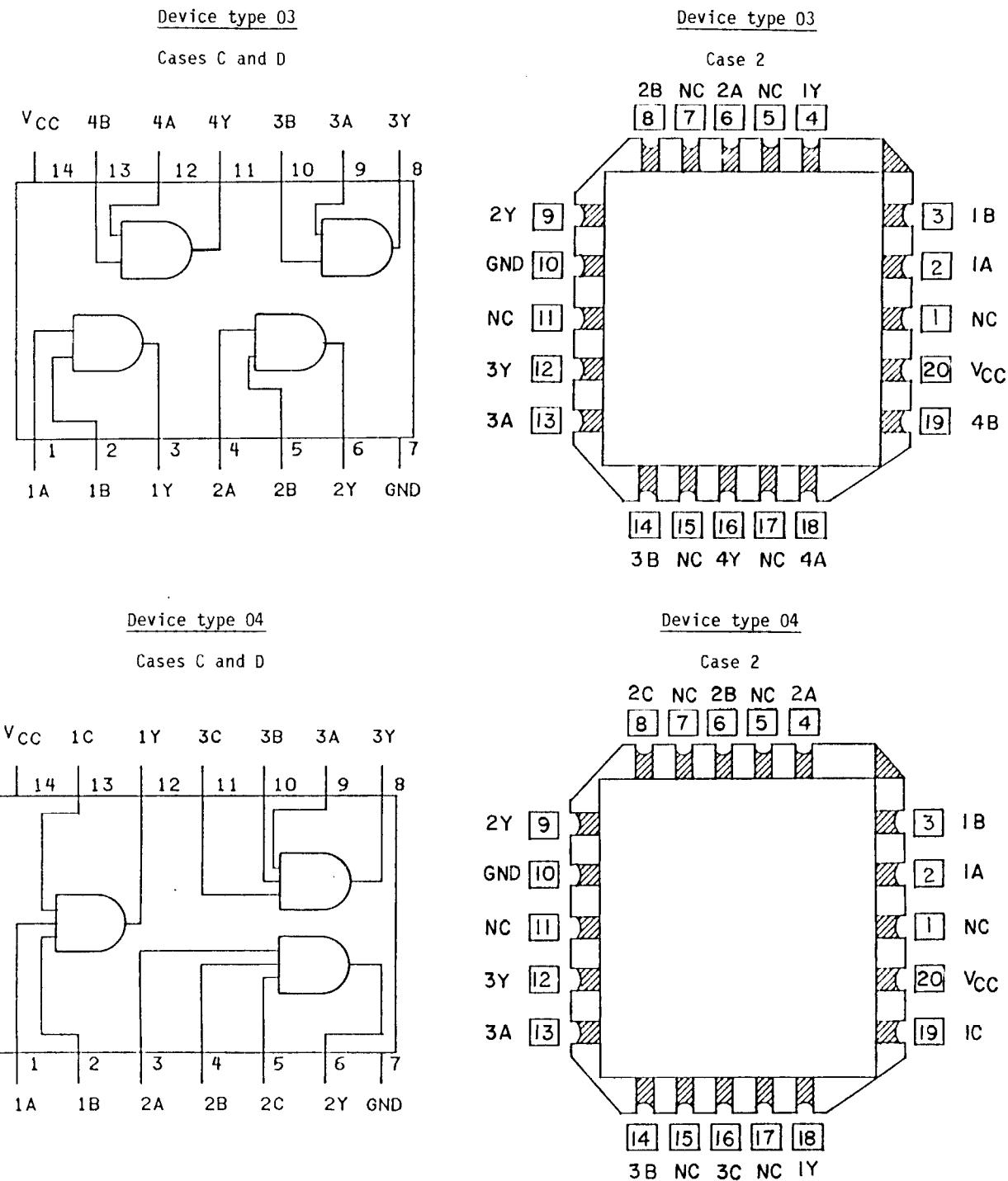


FIGURE 1. Logic diagram and terminal connections (top views) - Continued.

Device type 01

Truth table (each gate)		
Inputs		Output
A	B	Y
H	X	H
X	H	H
L	L	L

X = irrelevant

Positive logic: $Y = A + B$ Device type 02

Truth table (each gate)		
Inputs		Output
A	B	Y
L	L	L
L	H	H
H	L	H
H	H	L

Positive logic:

$$Y = A \oplus B = \overline{AB} + A\overline{B}$$

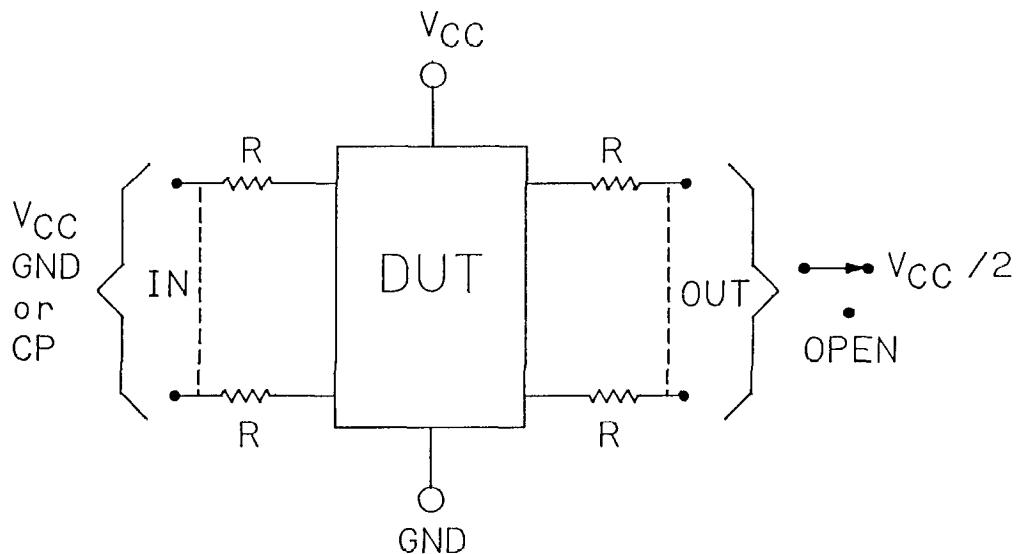
Device type 04

Truth table (each gate)			
Inputs			Output
A	B	C	Y
L	L	L	L
H	L	L	L
H	H	L	L
H	L	H	L
L	L	H	L
L	H	L	L
L	H	H	L
H	H	H	H

Device type 03

Truth table (each gate)		
Inputs		Output
A	B	Y
L	L	L
H	L	L
L	H	L
H	H	H

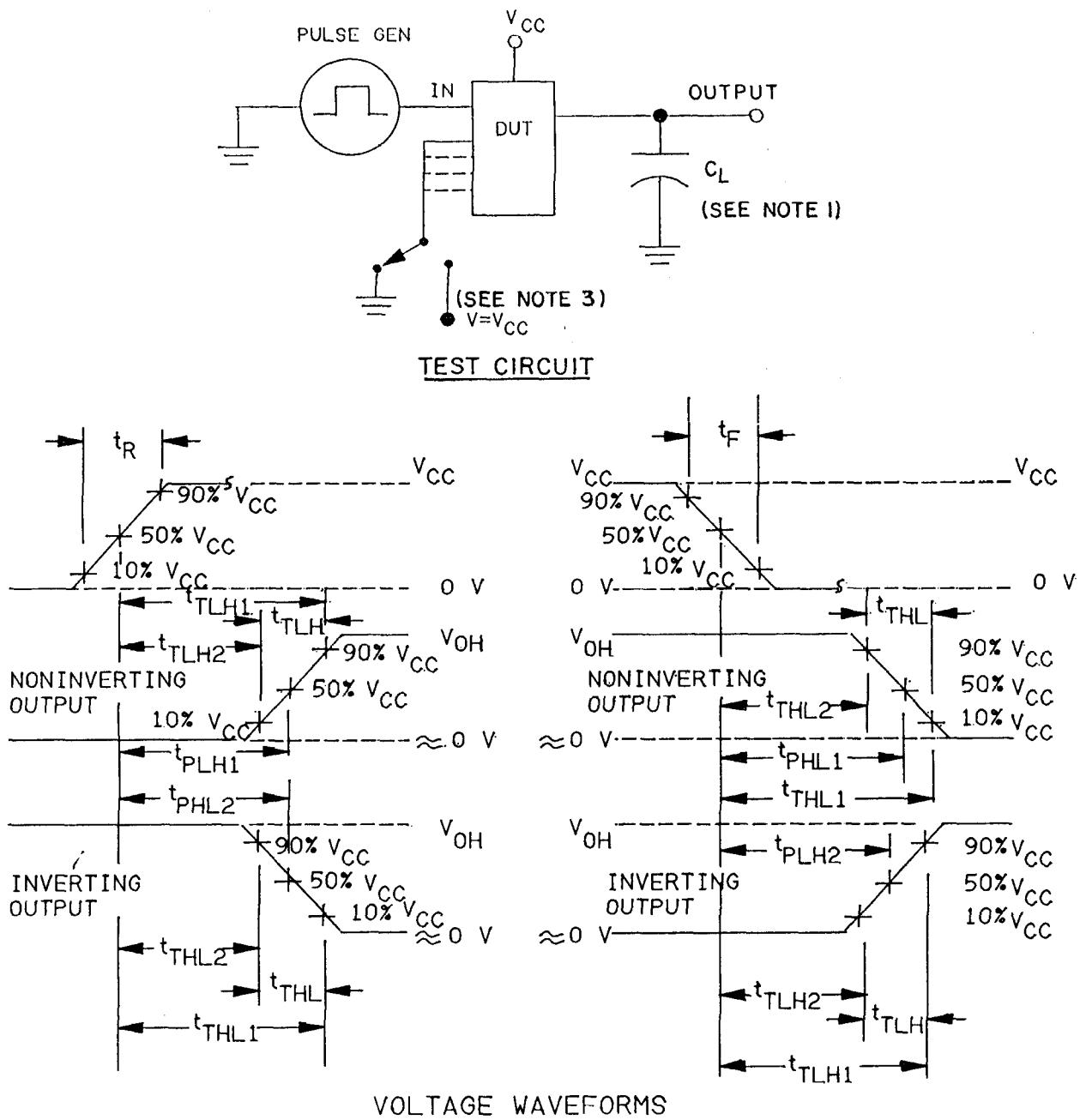
Positive logic: $Y = AB$ FIGURE 2. Truth table and logic equations.



NOTES:

1. For static burn-in I, all inputs shall be connected to GND. Outputs shall be open or connected to $V_{CC}/2$. Resistors are optional on outputs if open. Resistors are required on inputs and outputs connected to $V_{CC}/2$. $R = 47\Omega$ to $47\text{ k}\Omega$.
2. For static burn-in II, all inputs shall be connected through a resistor to V_{CC} . Outputs shall be open or connected to $V_{CC}/2$. Resistors are optional on outputs if open. Resistors are required on inputs and on outputs connected to $V_{CC}/2$. $R = 47\Omega$ to $47\text{ k}\Omega$.
3. For dynamic burn-in, all inputs shall be connected through the resistors in parallel to a common CP. Outputs shall be connected to $V_{CC}/2 \pm 0.5$ V through the resistors. $R = 1\text{ k} \pm 5\%$ for outputs, 47Ω to $47\text{ k}\Omega$ for inputs. For device type 02, 1 input/gate tied to V_{CC} or GND.
4. CP = 25 kHz to 1 MHz square wave; duty cycle = 50 $\pm 15\%$; $V_{IH} = 4.5$ V to V_{CC} ; $V_{IL} = 0 \pm 0.5$ V transition time $\leq 0.5\ \mu\text{s}$.
5. $V_{CC} = 6.0$ V ± 0.5 V.

FIGURE 3. Burn-in and life test circuits.

**NOTES:**

- $C_L = 50 \text{ pF} \pm 10\%$ (including probe and jig capacitance).
- Input pulse characteristics:
 $t_R = t_F \leq 6 \text{ ns}$; PRR $\leq 1 \text{ MHz}$; Duty cycle - 50%.
- All unused inputs are tied to V_{CC} for device types 02, 03, 04, and to GND for device type 01.
- $t_{TLH} = t_{TLH1} - t_{TLH2}$; $t_{THL} = t_{THL1} - t_{THL2}$.

FIGURE 4. Switching time test circuit and waveforms.

TABLE III. Group A Inspection for device type 01.

Symbol	MIL-STD-883 Method	Case 2 Class C,D	Terminal conditions 1/												Test limits						
			Subgroup 1 $T_C = +25^\circ\text{C}$						Subgroup 2 $T_C = +125^\circ\text{C}$						Subgroup 3 $T_C = -55^\circ\text{C}$			Unit			
			Test no.	1A	1B	1Y	2A	2B	2Y	GND	3Y	3A	3B	4Y	4A	4B	VCC	Mn	Mx	Mn	Mx
V_{IC} (I_{DS})	1	1 mA															GND	1A	1/ μ A	1.5	
	2	1 mA																1B	2A		
	3	1 mA																2B	3A		
	4	1 mA																3B	4A		
	5	1 mA																4B			
	6	1 mA																			
	7	1 mA																			
	8	1 mA																			
V_{IC} (I_{DS})	9	-1 mA																1A	1/ μ A	1.5	
	10	-1 mA																1B	2A		
	11	-1 mA																2B	3A		
	12	-1 mA																3B	4A		
	13	-1 mA																4B			
	14	-1 mA																			
	15	-1 mA																			
	16	-1 mA																			
I_{CC}	3005	17	6 V	GND	6 V		6 V	GND	6 V		6 V	GND	6 V		6 V	GND	6 V	6 V	6 V	0.1	10 μ A
	18	GND	6 V																		
I_{CLL}	3005	19	GND	GND	GND		GND	GND	GND		GND	GND	GND		GND	GND	GND	6 V	V _{CC}	0.1	10 μ A
V_{OH3}	3006	20	4.2 V	1.2 V	-20 μ A		4.2 V	1.2 V	-20 μ A		4.2 V	1.2 V	-20 μ A		4.2 V	1.2 V	-20 μ A	4.2 V	1.2 V	5.95	5.95
	21	1.2 V	4.2 V	-20 μ A		1.2 V	4.2 V	1.2 V	-20 μ A		1.2 V	4.2 V	1.2 V	-20 μ A	1.2 V	4.2 V	1.2 V	4.2 V	1.2 V	5.95	5.95
	22																				
	23																				
	24																				
	25																				
	26																				
	27																				
V_{OH5}	3006	28	4.2 V	1.2 V	-5.2 μ A		4.2 V	1.2 V	-5.2 μ A		4.2 V	1.2 V	-5.2 μ A		4.2 V	1.2 V	-5.2 μ A	4.2 V	1.2 V	5.48	5.48
	29	1.2 V	4.2 V	-5.2 μ A		1.2 V	4.2 V	1.2 V	-5.2 μ A		1.2 V	4.2 V	1.2 V	-5.2 μ A	1.2 V	4.2 V	1.2 V	4.2 V	1.2 V	5.48	5.48
	30																				
	31																				
	32																				
	33																				
	34																				
	35																				
V_{OL3}	3007	36	1.2 V	1.2 V	20 μ A		1.2 V	1.2 V	20 μ A		1.2 V	1.2 V	20 μ A		1.2 V	1.2 V	20 μ A	1.2 V	1.2 V	0.05	0.05
	37																				
	38																				
	39																				
V_{OL5}	3007	40	1.2 V	1.2 V	5.2 μ A		1.2 V	1.2 V	5.2 μ A		1.2 V	1.2 V	5.2 μ A		1.2 V	1.2 V	5.2 μ A	1.2 V	1.2 V	.26	.26
	41																				
	42																				
	43																				
I_{OS4}	3011	44	4 V	4 V	GND		4 V	4 V	GND		4 V	4 V	GND		4 V	4 V	GND	4 V	4 V	.1	.1
	45																				
	46																				
	47																				
I_{IH}	3010	48	6 V	GND	6 V		6 V	GND	6 V		6 V	GND	6 V		6 V	GND	6 V	6 V	6 V	.05	.1
	49																				
	50																				
	51																				
	52																				
	53																				
	54																				
	55																				

See footnotes at end of device type 04.

TABLE III. Group A inspection for device type 01 - Continued.

Symbol	MIL-STD-883 method	Case 2 (Case 0) test no.	Test limits											
			Terminal conditions \underline{V}						Measured terminal conditions \underline{V}					
			Subgroup 1 $T_C = +25^\circ C$						Subgroup 2 $T_C = +125^\circ C$			Subgroup 3 $T_C = -55^\circ C$		
			Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max
I _{IL}	3009	56 57 58 59 60 61 62 63	GND 6 V GND 6 V GND 6 V GND 6 V	6 V " " " " " " " "	1A 1B 2A 3A 4A 4B 4C 4D	1A 1B 2A 3A 3B 4A 4B	-0.1 "	1A 1B 2A 3A 3B 4A 4B	-0.1 " " " " " " " " " " " " " " " " " "					
C ₁	3012	64 65 66 67 68 69 70 71	$\underline{2}/$ $\underline{2}/$ $\underline{2}/$ $\underline{2}/$ $\underline{2}/$ $\underline{2}/$ $\underline{2}/$ $\underline{2}/$	$\underline{2}/$ $\underline{2}/$ $\underline{2}/$ $\underline{2}/$ $\underline{2}/$ $\underline{2}/$ $\underline{2}/$ $\underline{2}/$	$\underline{2}/$ $\underline{2}/$ $\underline{2}/$ $\underline{2}/$ $\underline{2}/$ $\underline{2}/$ $\underline{2}/$ $\underline{2}/$	$\underline{2}/$ $\underline{2}/$ $\underline{2}/$ $\underline{2}/$ $\underline{2}/$ $\underline{2}/$ $\underline{2}/$ $\underline{2}/$	$\underline{2}/$ $\underline{2}/$ $\underline{2}/$ $\underline{2}/$ $\underline{2}/$ $\underline{2}/$ $\underline{2}/$ $\underline{2}/$	GND " " " " " " " "	GND " " " " " " " "	1A 1B 2A 3A 3B 4A 4B	1A 1B 2A 3A 3B 4A 4B	10 "	10 "	
t _{PLH}	3003 (Fig. 4)	72 73 74 75 76 77 78 79	IN GND IN IN IN IN IN IN	OUT OUT OUT OUT OUT OUT OUT OUT	IN GND IN IN IN IN IN IN	OUT OUT OUT OUT OUT OUT OUT OUT	IN GND IN IN IN IN IN IN	GND " " " " " " " "	GND " " " " " " " "	1A to 1Y 1B to 1Y 1C to 2Y 1D to 2Y 1E to 3Y 1F to 3Y 1G to 4Y 1H to 4Y	1A to 1Y 1B to 1Y 1C to 2Y 1D to 2Y 1E to 3Y 1F to 3Y 1G to 4Y 1H to 4Y	3 "	3 " " " " " "	
t _{PLH}	3003 (Fig. 4)	80 87	Same terminal conditions and limits as specified above for t _{PLH} .											
t _{TLH}	3004 (Fig. 4)	88 89 90 91 92 93 94 95	IN GND IN IN IN IN IN IN	OUT OUT OUT OUT OUT OUT OUT OUT	IN GND IN IN IN IN IN IN	OUT OUT OUT OUT OUT OUT OUT OUT	IN GND IN IN IN IN IN IN	GND " " " " " " " "	GND " " " " " " " "	1A to 1Y 1B to 1Y 1C to 2Y 1D to 2Y 1E to 3Y 1F to 3Y 1G to 4Y 1H to 4Y	1A to 1Y 1B to 1Y 1C to 2Y 1D to 2Y 1E to 3Y 1F to 3Y 1G to 4Y 1H to 4Y	3 " " " " " "	3 " " " " " "	
t _{TLH}	3003 (Fig. 4)	96 103	Same terminal conditions and limits as specified above for t _{PLH} .											

See footnotes at end of device type 04.

TABLE III. Group A inspection for device type 02.

Symbol	MIL-STD-883 Case 2	Terminal conditions Σ												Test limits						
		Case 2 Test No.	3	4	6	8	9	10	12	13	14	16	18	19	20	Measured terminal	Subgroup 1	Subgroup 2	Subgroup 3	Unit
Method	Case 2 Test No.	1A	2	3	4	5	6	7	8	9	10	11	12	13	14	TC = +25°C	TC = +125°C	TC = -55°C		
V_{AC} I_{AC}	1	1 mA	1 mA	1 mA	1 mA	1 mA	1 mA	1 mA	1 mA	1 mA	1 mA	1 mA	1 mA	1 mA	GND	1A	1A	1A	1A	V
	2															1B	1B	1B	1B	
	3															2A	2A	2A	2A	
	4															3A	3A	3A	3A	
	5															3B	3B	3B	3B	
	6															4A	4A	4A	4A	
	7															4B	4B	4B	4B	
	8																			
V_{AC} I_{AC}	9	-1 mA	-1 mA	-1 mA	-1 mA	-1 mA	-1 mA	-1 mA	-1 mA	-1 mA	-1 mA	-1 mA	-1 mA	-1 mA	GND	1A	1A	1A	1A	V
	10															1B	1B	1B	1B	
	11															2A	2A	2A	2A	
	12															3A	3A	3A	3A	
	13															3B	3B	3B	3B	
	14															4A	4A	4A	4A	
	15															4B	4B	4B	4B	
	16																			
I_{CCH}	3005	17	6 V	GND	6 V	6 V	GND	6 V	6 V	GND	6 V	6 V	GND	6 V	6 V	GND	6 V	6 V	6 V	μ A
	18																			
I_{CCL}	3005	19	6 V	GND	6 V	6 V	GND	6 V	6 V	GND	6 V	6 V	GND	6 V	6 V	GND	6 V	6 V	6 V	μ A
	20																			
V_{OH3}	3006	21	4.2 V	1.2 V	20 A	-20 A	20 A	-20 A	20 A	-20 A	20 A	-20 A	20 A	-20 A	20 A	20 A	20 A	20 A	20 A	V
	22																			
	23																			
	24																			
	25																			
	26																			
	27																			
	28																			
V_{OH5}	3006	29	4.2 V	1.2 V	-5.2 mA	-5.2 mA	4.2 V	1.2 V	4.2 V	1.2 V	4.2 V	1.2 V	4.2 V	1.2 V	4.2 V	-5.2 mA	4.2 V	1.2 V	4.2 V	5.48
	30																			5.48
	31																			
	32																			
	33																			
	34																			
	35																			
	36																			
V_{OL3}	3007	37	4.2 V	4.2 V	20 μ A	20 μ A	4.2 V	4.2 V	20 μ A	20 μ A	4.2 V	4.2 V	20 μ A	20 μ A	20 μ A	4.2 V	4.2 V	4.2 V	.05	.05
	38																			
	39																			
	40																			
	41																			
	42																			
	43																			
	44																			
V_{OL5}	3007	45	4.2 V	4.2 V	5.2 mA	5.2 mA	4.2 V	4.2 V	5.2 mA	5.2 mA	4.2 V	4.2 V	5.2 mA	4.2 V	5.2 mA	4.2 V	4.2 V	4.2 V	.26	.26
	46																			
	47																			
	48																			
	49																			
	50																			
	51																			
	52																			
I_{OL4}	3011	53	4 V	GND	4 V	GND	4 V	GND	4 V	GND	4 V	GND	4 V	GND	4 V	GND	4 V	GND	4 V	μ A
	54																			
	55																			
	56																			
	57																			
	58																			
	59																			
	60																			

See footnotes at end of device type 04.

TABLE III. Group A inspection for device type 02 - Continued.

Symbol	MIL-STD-883 method	Case 2 (Case C,D)	Test limits											
			Terminal conditions 1/						Measured terminal conditions 2/					
			Subgroup 1 $T_C = +25^\circ\text{C}$			Subgroup 2 $T_C = +125^\circ\text{C}$			Subgroup 3 $T_C = -55^\circ\text{C}$			Subgroup 4 $T_C = +25^\circ\text{C}$		
		test no.	IA	IB	IC	IA	IB	IC	IA	IB	IC	IA	IB	IC
			1A	1B	1Y	2A	2B	2Y	3A	3B	3Y	4A	4B	VCC
I _{1H}	3010	61	6 V	GND								6 V	1A	.1
		62	GND	6 V									.05	
		63												
		64												
		65												
		66												
		67												
		68												
I _{1L}	3009	69	GND	6 V								6 V	1A	.1
		70	6 V	GND									.05	
		71												
		72												
		73												
		74												
		75												
		76												
C ₁	3012	77	2/	2/								GND	1A	10
		78											1B	
		79											2A	
		80											2B	
		81											3A	
		82											3B	
		83											4A	
		84											4B	
t _{pHL1}	3003 (Fig. 4)	85	IN	GND	OUT									
		86	GND	IN	OUT									
		87												
		88												
		89												
		90												
		91												
		92												
t _{pHL1} (Fig. 4) to 100	3003 (Fig. 4)	93	Same terminal conditions and limits as specified above for t _{pHL1} .											
t _{pHL2}	3003 (Fig. 4)	101	IN	4.5 V	OUT									
		102	4.5 V	IN	OUT									
		103												
		104												
		105												
		106												
		107												
		108												
t _{pHL2} (Fig. 4) to 116	3003 (Fig. 4)	109	Same terminal conditions and limits as specified above for t _{pHL2} .											

See footnotes at end of device type 04.

TABLE III. Group A inspection for device type 02 - Continued.

Symbol	MIL-SID-883 Case 2 Test no.	Method Test no.	Terminal conditions ^{1/}												Test limits											
			2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	Measured terminal 4A	Subgroup 1 TC = +25°C	Subgroup 2 TC = +125°C	Subgroup 3 TC = -55°C	Unit
t _{TTL}	3004	117	IN	GND	OUT	GND																				
	(Fig. 4)	118	GND	IN	OUT	IN	GND	OUT	OUT	IN	GND	OUT	OUT	IN	GND	OUT	OUT	IN	GND	OUT	IN	1Y	1Y	1Y	ns	
		119																					2Y	2Y	2Y	
		120																					3Y	3Y	3Y	
		121																					4Y	4Y	4Y	
		122																								
		123																								
		124																								
t _{TTL}	3004	125	Same terminal conditions and limits as specified above for t _{TTL} .																							
	(Fig. 4)	to 132																								

See footnotes at end of device type 04.

TABLE III. Group A inspection for device type 03.

Symbol	MIL-STD-883 method	Case 2 Cases 3, D Test no.	Terminal conditions 1/												test limits							
			2	3	4	6	8	9	10	12	13	14	16	18	19	20	Measured terminal	Subgroup 1 TC = +25°C	Subgroup 2 TC = +125°C	Subgroup 3 TC = -55°C	Unit	
V_{C_0} (β_{os})		1 2 3 4 5 6 7 8	1 mA	1 mA	1 mA	1 mA	1 mA	1 mA	1 mA	1 mA	1 mA	1 mA	1 mA	1 mA	1 mA	GND	1A 1B 2A 2B 3A 3B 4A 4B	1A 1B 2A 2B 3A 3B 4A 4B	1A 1B 2A 2B 3A 3B 4A 4B	1A 1B 2A 2B 3A 3B 4A 4B	V _{CC}	
V_{C_0} (Neg)		9 10 11 12 13 14 15 16	-1 mA	-1 mA	-1 mA	-1 mA	-1 mA	-1 mA	-1 mA	-1 mA	-1 mA	-1 mA	-1 mA	-1 mA	-1 mA	GND	1A 1B 2A 2B 3A 3B 4A 4B	1A 1B 2A 2B 3A 3B 4A 4B	1A 1B 2A 2B 3A 3B 4A 4B	1A 1B 2A 2B 3A 3B 4A 4B	V _{CC}	
I _{CCH}	3005	17 18 19 20 21 22 23 24 25 26 27	6 V	6 V	6 V	6 V	6 V	6 V	6 V	6 V	6 V	6 V	6 V	6 V	6 V	GND	6 V GND	6 V GND	6 V GND	6 V GND	6 V GND	
I _{CCL}	3005	18 19 20 21 22 23 24 25 26 27	6 V	6 V	6 V	6 V	6 V	6 V	6 V	6 V	6 V	6 V	6 V	6 V	6 V	GND	6 V GND	6 V GND	6 V GND	6 V GND	6 V GND	
V_{OH3}	3006	20 21 22 23 24 25 26 27	4.2 V	4.2 V	-20 μ A	4.2 V	4.2 V	4.2 V	4.2 V	4.2 V	4.2 V	4.2 V	4.2 V	4.2 V	4.2 V	-20 μ A	4.2 V GND	4.2 V GND	4.2 V GND	4.2 V GND	4.2 V GND	
V_{OH5}	3006	24 25 26 27 28 29 30 31 32 33 34 35	4.2 V	4.2 V	-5.2 mA	4.2 V	4.2 V	4.2 V	4.2 V	4.2 V	4.2 V	4.2 V	4.2 V	4.2 V	4.2 V	-5.2 mA	4.2 V GND	4.2 V GND	4.2 V GND	4.2 V GND	4.2 V GND	
V_{OL3}	3007	28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43	4.2 V	1.2 V	20 μ A	4.2 V	1.2 V	20 μ A	4.2 V	1.2 V	20 μ A	4.2 V	1.2 V	20 μ A	4.2 V	20 μ A	4.2 V GND	4.2 V GND	4.2 V GND	4.2 V GND	4.2 V GND	
V_{OL5}	3007	36 37 38 39 40 41 42 43 44 45 46 47	4.2 V	1.2 V	5.2 mA	4.2 V	1.2 V	5.2 mA	4.2 V	1.2 V	5.2 mA	4.2 V	1.2 V	5.2 mA	4.2 V	1.2 V	5.2 mA	4.2 V GND	4.2 V GND	4.2 V GND	4.2 V GND	4.2 V GND
I _{OH4}	3011	44 45 46 47 48 49 50 51 52 53 54 55	4 V	4 V	GND	4 V	4 V	GND	4 V	4 V	GND	4 V	4 V	GND	4 V	4 V	GND	4 V GND	4 V GND	4 V GND	4 V GND	4 V GND
I _{IRH}	3010	48 49 50 51 52 53 54 55	6 V	6 V	6 V	6 V	6 V	6 V	6 V	6 V	6 V	6 V	6 V	6 V	6 V	GND	6 V GND	6 V GND	6 V GND	6 V GND	6 V GND	

See footnotes at end of device type 04.

TABLE III. Group A inspection for device type 03 - Continued.

See footnotes at end of device type 04.

TABLE III. Group A inspection for device type 04.

Symbol	MIL-STD-883 method	Test conditions ΣV_{DD}												Test limits												
		Case 2						Case C,D						Case E,F						Case G,H						
Test no.		1A	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	Measured terminal	Subgroup 1	Subgroup 2	Subgroup 3	Unit
$V_{DD(S)}$		1	1 mA	1 mA	1 mA	1 mA	1 mA	1 mA	1 mA	1 mA	1 mA	1 mA	1 mA	1 mA	1 mA	1 mA	1A	1B	1C	1D	TC = +25°C					
		2																				1A	1B	1C	1D	TC = +125°C
		3																				2A	2B	2C	2D	TC = -55°C
		4																				3A	3B	3C	3D	TC = -20°C
		5																				3A	3B	3C	3D	TC = 0°C
		6																				3A	3B	3C	3D	TC = 70°C
		7																				3A	3B	3C	3D	TC = 100°C
		8																				3A	3B	3C	3D	TC = 125°C
		9																				3A	3B	3C	3D	TC = 150°C
$V_{CC(E)}$		10	-1 mA	-1 mA	-1 mA	-1 mA	-1 mA	-1 mA	-1 mA	-1 mA	-1 mA	-1 mA	-1 mA	-1 mA	-1 mA	-1 mA	1A	1B	1C	1D	TC = +25°C					
		11																				2A	2B	2C	2D	TC = -55°C
		12																				3A	3B	3C	3D	TC = -20°C
		13																				3A	3B	3C	3D	TC = 0°C
		14																				3A	3B	3C	3D	TC = 70°C
		15																				3A	3B	3C	3D	TC = 100°C
		16																				3A	3B	3C	3D	TC = 125°C
		17																				3A	3B	3C	3D	TC = 150°C
		18																				3A	3B	3C	3D	TC = 180°C
$I_{CC(H)}$	3005	19	6 V	6 V	6 V	6 V	6 V	6 V	6 V	6 V	6 V	6 V	6 V	6 V	6 V	6 V	6 V	6 V	6 V	6 V	6 V	V _{CC}	V _{CC}	V _{CC}	V _{CC}	TC = +25°C
		20	6 V	GND	6 V	GND	6 V	GND	6 V	GND	6 V	GND	6 V	GND	6 V	GND	6 V	GND	6 V	GND	GND	V _{CC}	V _{CC}	V _{CC}	V _{CC}	TC = -55°C
		21	GND	GND	GND	GND	GND	GND	GND	GND	GND	GND	GND	GND	GND	GND	GND	GND	GND	GND	GND	V _{CC}	V _{CC}	V _{CC}	V _{CC}	TC = -20°C
		22																				3Y	3Y	3Y	3Y	TC = 0°C
		23	4.2 V	4.2 V	4.2 V	4.2 V	4.2 V	4.2 V	4.2 V	4.2 V	4.2 V	4.2 V	4.2 V	4.2 V	4.2 V	4.2 V	1Y	1Y	1Y	1Y	TC = 70°C					
		24																				2Y	2Y	2Y	2Y	TC = 100°C
		25																				3Y	3Y	3Y	3Y	TC = 125°C
		26	4.2 V	4.2 V	4.2 V	4.2 V	4.2 V	4.2 V	4.2 V	4.2 V	4.2 V	4.2 V	4.2 V	4.2 V	4.2 V	4.2 V	1Y	1Y	1Y	1Y	TC = 150°C					
		27																				2Y	2Y	2Y	2Y	TC = 180°C
		28																				3Y	3Y	3Y	3Y	TC = 200°C
V_{DD3}	3006	29	4.2 V	4.2 V	4.2 V	4.2 V	4.2 V	4.2 V	4.2 V	4.2 V	4.2 V	4.2 V	4.2 V	4.2 V	4.2 V	4.2 V	6 V	6 V	6 V	6 V	TC = +25°C					
		30	4.2 V	4.2 V	4.2 V	4.2 V	4.2 V	4.2 V	4.2 V	4.2 V	4.2 V	4.2 V	4.2 V	4.2 V	4.2 V	4.2 V	6 V	6 V	6 V	6 V	TC = -55°C					
		31	4.2 V	4.2 V	4.2 V	4.2 V	4.2 V	4.2 V	4.2 V	4.2 V	4.2 V	4.2 V	4.2 V	4.2 V	4.2 V	4.2 V	6 V	6 V	6 V	6 V	TC = -20°C					
		32																				1.2 V	1.2 V	1.2 V	1.2 V	TC = 0°C
		33																				2Y	2Y	2Y	2Y	TC = 70°C
		34																				3Y	3Y	3Y	3Y	TC = 100°C
		35																				3Y	3Y	3Y	3Y	TC = 125°C
		36																				3Y	3Y	3Y	3Y	TC = 150°C
		37																				3Y	3Y	3Y	3Y	TC = 180°C
V_{DD5}	3007	38	4.2 V	4.2 V	4.2 V	4.2 V	4.2 V	4.2 V	4.2 V	4.2 V	4.2 V	4.2 V	4.2 V	4.2 V	4.2 V	4.2 V	1Y	1Y	1Y	1Y	TC = +25°C					
		39	4.2 V	4.2 V	4.2 V	4.2 V	4.2 V	4.2 V	4.2 V	4.2 V	4.2 V	4.2 V	4.2 V	4.2 V	4.2 V	4.2 V	1Y	1Y	1Y	1Y	TC = -55°C					
		40	4.2 V	4.2 V	4.2 V	4.2 V	4.2 V	4.2 V	4.2 V	4.2 V	4.2 V	4.2 V	4.2 V	4.2 V	4.2 V	4.2 V	1Y	1Y	1Y	1Y	TC = -20°C					
		41																				2Y	2Y	2Y	2Y	TC = 0°C
		42																				3Y	3Y	3Y	3Y	TC = 70°C
		43																				3Y	3Y	3Y	3Y	TC = 100°C
		44																				3Y	3Y	3Y	3Y	TC = 125°C
		45																				3Y	3Y	3Y	3Y	TC = 150°C
		46																				3Y	3Y	3Y	3Y	TC = 180°C
I_{DS4}	3011	47	4 V	4 V	4 V	4 V	4 V	4 V	4 V	4 V	4 V	4 V	4 V	4 V	4 V	4 V	4 V	4 V	4 V	4 V	4 V	4 V	4 V	4 V	4 V	TC = +25°C
		48																				2Y	2Y	2Y	2Y	TC = -55°C
		49																				3Y	3Y	3Y	3Y	TC = -20°C
I_{LH}	3010	50	6 V	GND	6 V	GND	6 V	GND	6 V	GND	6 V	GND	6 V	GND	6 V	GND	6 V	GND	6 V	GND	6 V	1A	1B	1C	1D	TC = +25°C
		51	6 V	GND	6 V	GND	6 V	GND	6 V	GND	6 V	GND	6 V	GND	6 V	GND	6 V	GND	6 V	GND	6 V	1A	1B	1C	1D	TC = -55°C
		52																				2A	2B	2C	2D	TC = -20°C
		53																				3A	3B	3C	3D	TC = 0°C
		54																				3A	3B	3C	3D	TC = 70°C
		55																				3A	3B	3C	3D	TC = 100°C
		56																				3A	3B	3C	3D	TC = 125°C
		57																				3A	3B	3C	3D	TC = 150°C
		58																				3A	3B	3C	3D	TC = 180°C

See footnotes at the end of device type 94.

TABLE III. Group A inspection for device type 04 - Continued.

Input pins not designated shall be high level logic or low level logic, or may be left open provided they do not influence the outcome of the measurement. Output pins not designated shall be tied to the rails or left open provided they do not influence the outcome of the measurement.

- a. **V_{IOPD5}** tests: The GND terminal shall be open. Minimum limit of 0.4 V applies to tests being performed on equipment not capable of opening GND pin during test.
 - b. **V_{IC(neg)}** tests: The VCC terminal shall be open.
 - c. **I_{CC}** tests: The output terminal shall be open.

See 4.4.1.c. For all type input terminals (e.g. clock, clear, data, etc.) a minimum of 3 inputs of each per device shall be tested.

See 4.4.1.d.

1. Test method 3015, table I pin combinations 4(V+(A) to common (B)) and 5(V+(B) to common (A)) shall be deleted.
2. The test sequence specified in 3.b of method 3015 shall be repeated an additional four times instead of two.
3. The category A limits specified on figure 3015-3, ESD sensitivity category, shall be 1000 V to 2000 V. Only those device types that pass this testing at 1000 V or greater shall be considered as conforming to the requirements of this specification.
- c. End-point electrical parameters shall be as specified in table II herein. Delta limits shall apply only to subgroup 5 of group B inspections and shall consist of tests specified in table IV herein.

4.4.3 Group C inspection. Group C inspection shall be in accordance with table III of method 5005 of MIL-STD-883 and as follows:

- a. End-point electrical parameters shall be as specified in table II herein. Delta limits shall apply only to subgroup 1 of group C inspection and shall consist of tests specified in table IV herein.
- b. Steady-state life test (method 1005 of MIL-STD-883) conditions:
 - (1) Test condition D and as specified in 4.5.2 herein and as shown on figure 3 (note 3), or equivalent.
 - (2) $T_A = +125^\circ\text{C}$ minimum.
 - (3) Test duration, 1,000 hours, except as permitted by method 1005 of MIL-STD-883.

4.4.4 Group D inspection. Group D inspection shall be in accordance with table IV of method 5005 of MIL-STD-883. End-point electrical parameters shall be as specified in table II herein.

4.5 Methods of inspection. Methods of inspection shall be specified as follows:

4.5.1 Voltage and current. Unless otherwise specified, all voltages given are referenced to the microcircuit GND terminal. Currents given are conventional and positive when flowing into the referenced terminal.

4.5.2 Burn-in and life test cool down procedures. When the burn-in and life tests are completed and prior to removal of bias voltages, the devices under test (DUT) shall be cooled to within 10°C of their power stable condition at room temperature; then, electrical parameter end-point measurements shall be performed.

TABLE IV. Delta limits at 25°C .

Parameter 1/	Device types	
	All	
I_{CC}		$\pm 30 \text{ nA}$

1/ The above parameters shall be recorded before and after the required burn-in and life tests to determine deltas (Δ).

4.5.3 Quiescent supply current (I_{CC} test). When performing quiescent supply current measurements (I_{CC}), the meter shall be placed so that all currents flow through the meter.

4.6 Data reporting. When specified in the purchase order or contract, a copy of the following data, as applicable, shall be supplied.

- a. Attributes data for all screening tests (see 4.2) and variables data for all static burn-in, dynamic burn-in, and steady-state life tests (see 3.5).
- b. A copy of each radiograph.
- c. The quality conformance inspection data (see 4.4).
- d. Parameter distribution data on parameters evaluated during burn-in (see 3.5).
- e. Final electrical parameters data (see 4.2c).

5. PACKAGING

5.1 Packaging requirements. The requirements for packaging shall be in accordance with MIL-M-38510.

6. NOTES

6.1 Intended use. Microcircuits conforming to this specification are intended for original equipment design application and logistic support of existing equipment.

6.2 Ordering data. The acquisition document should specify the following:

- a. Complete part number (see 1.2).
- b. Requirements for delivery of one copy of the quality conformance inspection data pertinent to the device inspection lot to be supplied with each shipment by the device manufacturer, if applicable.
- c. Requirements for certificate of compliance, if applicable.
- d. Requirements for notification of change of product or process to the contracting activity in addition to notification to the qualifying activity, if applicable.
- e. Requirements for failure analysis (including required test condition of method 5003 of MIL-STD-883), corrective action and reporting of results, if applicable.
- f. Requirements for product assurance options.
- g. Requirements for special carriers, lead lengths, or lead forming, if applicable. These requirements shall not affect the part number. Unless otherwise specified, these requirements shall not apply to direct purchase by, or direct shipment to the Government.
- h. Requirements for "JAN" marking.
- i. Requirements for total dose radiation testing (see 3.6.1), if applicable.

6.3 Abbreviations, symbols, and definitions. The abbreviations, symbols, and definitions used herein are defined in MIL-M-38510, MIL-STD-1331, and as follows:

T _C	- - - - -	Case temperature
C _i	- - - - -	Input terminal-to-GND capacitance.
GND	- - - - -	Ground zero voltage potential.
I _{CC}	- - - - -	Quiescent supply current.
T _A	- - - - -	Free air temperature.
V _{CC}	- - - - -	Positive supply voltage.
C _{PD}	- - - - -	Power dissipation capacitance.

6.4 Logistic support. Lead materials and finishes (see 3.3) are interchangeable. Unless otherwise specified, microcircuits acquired for Government logistic support will be acquired to device class S for National Aeronautics and Space Administration or class B for Department of Defense (see 1.2.2), lead finish C (see 3.3). Longer length leads and lead forming shall not affect the part number.

6.5 Substitutability. The cross-reference information below is presented for the convenience of users. Microcircuits covered by this specification will functionally replace the listed generic-industry type. Generic-industry microcircuit types may not have equivalent operational performance characteristics across military temperature ranges or reliability factors equivalent to MIL-M-38510 device types and may have slight physical variations in relation to case size. The presence of this information shall not be deemed as permitting substitution of generic-industry types for MIL-M-38510 types or as a waiver of any of the provisions of MIL-M-38510.

Military device type	Generic-industry type
01	54HC32
02	54HC86
03	54HC08
04	54HC11

6.6 Handling. MOS devices must be handled with certain precautions to avoid damage due to accumulation of static charge. Input protective devices have been designed in the chip to minimize the effect of this static build up. However, the following handling practices are recommended:

- a. Devices should be handled on benches with conductive and grounded surface.
- b. Ground test equipment and tools.
- c. Do not handle devices by the leads.
- d. Store devices in conductive foam or carriers.
- e. Avoid use of plastic, rubber, or silk in MOS areas.
- f. Maintain relative humidity above 50 percent, if practical.